

work is contrasted with that of his three great contemporaries, Cavendish, Scheele and Lavoisier.

One explanation of these defects may be found in the fact that he was not, as he said, "a practical chemist," or, as we should say, a trained chemist. This was perfectly true. That he knew little about the substances which he employed in his experiments is evident from his habit of applying to his chemical friends for such materials as a man like Scheele would never have hesitated to prepare himself, and, moreover, the absorbing interest of his laboratory seems to have obliterated any inclination towards the study of text-books.

Priestley, in both his social and scientific life, seems to have been pursued by an ironical fate. On the one hand his honest zeal in the cause of reform was turned against him to his undoing; on the other, his experiments which were founded on his cherished theory of phlogiston became the weapon which demolished it. Priestley was fortunately endowed with a serene disposition, and in spite of his many misfortunes it would be incorrect to suppose that his life was not a source of real happiness and satisfaction. Such at least may be gathered from the perusal of the volume before us.

J. B. C.

SPHERICAL ASTRONOMY.

A Compendium of Spherical Astronomy with its Applications to the Determination and Reduction of Positions of the Fixed Stars. By Prof. Simon Newcomb. Pp. xviii+444. (London: Macmillan and Co., Ltd., 1906.) Price 12s. 6d. net.

AS Prof. Newcomb has been in close touch with all branches of the astronomy of position during the last forty years, and as so much of the progress that has been made is his work, a text-book by him on spherical astronomy will be eagerly examined by all who are interested in the subject.

With such qualifications we may be sure, before opening his book, that we shall be conducted to the various points on the frontiers of the subject, some of which it is necessary to occupy before an advance can be made in any direction; and we are also certain to be spared those tiresome digressions into problems such as "To find the season of the year, when twilight is shortest in a given latitude," which serve to degrade astronomy into a mere examination subject.

Let us examine Prof. Newcomb's arrangements. His first three chapters, forming part i., are introductory. They serve to equip the reader with a competent knowledge of spherical trigonometry, interpolation, and least squares. A pleasing feature at the end of each chapter is a page or two of bibliography.

Part ii. opens with a chapter on spherical coordinates. Practical illustration is given of the problem, so simple in theory and so laborious in practice, of turning latitude and longitude into right ascension and declination; and here we find a striking feature differentiating Prof. Newcomb's book from one that would be written by a mere lecturer on

astronomy. The lecturer, if he gave an example at all, would probably work to the nearest tenth of a degree with four-figure logarithms, and tell the reader that that sufficiently illustrates the method. Prof. Newcomb's book is for those who may want to carry out actually calculations of the kind. He therefore places before the reader two different computations of the same problem each with seven-figure logarithms, and knowing that the difficulty is the practical one of keeping out numerical blunders, and not in the last degree the theoretical one of understanding the formulæ, he adds a test computation, thus forcibly insisting upon the superior value of checks by test equations over checks by duplicate computation.

The fifth chapter of the book, the second of part ii., is on time, solar and sidereal, mean and apparent, Greenwich and local, the Besselian and Julian year, with numerical examples.

The sixth chapter is on parallax, naturally subdivided into figure of the earth, and formulæ for parallax in right ascension and so on.

The seventh chapter is a very short one on aberration.

The next chapter is on refraction. "There is perhaps," says the author, "no branch of practical astronomy on which so much has been written . . . and which is still in so unsatisfactory a state." Prof. Newcomb gives an excellent account of the various hypotheses as to the state of the upper regions of the atmosphere. We have not found any allusion to the way in which observed refractions are mixed up with division error, and R-D discordance. The question of systematic corrections has been reserved for a later chapter.

The ninth chapter, the last of part ii., is devoted to precession and nutation. This chapter, in particular, is full of formulæ and data for practical use, and, like the previous chapter, it concludes with an excellent bibliography.

Part iii. is devoted to the "reduction and determination of positions of the fixed stars." It is the part of the book where the author at length closes with the observations, and to which the previous parts are in fact merely introductory. But even now two more chapters of an introductory kind still remain, chapter x., on the application of precession and proper motion, chapter xi., on star corrections. In chapter xii. we come to a description of the methods of observation and allusion to the systematic errors to which observation is liable.

Chapter xiii. may be regarded as the real purpose of the book. It describes how individual catalogues are corrected so as to reduce them to an adopted system, and thus render them comparable with one another. At the end of the chapter is given a list of star catalogues.

The book concludes with an appendix giving tables and precepts for their use. We are inclined to consider some of these tables a mistake, or, at least, their inclusion in this book a mistake. The fact is that tables in constant use wear out very fast, and we

are none of us rich enough to care to throw aside a copy of a three-dollar book when four or five pages of it have become too dirty or too tattered to please our fastidiousness.

We do not know a more excellent book on its subject.
P. H. C.

OUR BOOK SHELF.

Die neueren Wandlungen der elektrischen Theorien einschliesslich der Elektronentheorie zwei Vorträge. By Dr. Gustave Holzmüller. Pp. viii + 119. (Berlin: Julius Springer, 1906.)

IN this little book the author publishes some lectures delivered before a society of German engineers. The subjects for discussion do not seem to have been selected on any principle, and are inadequately represented by the title. The first chapter deals with Newtonian potential, the second with logarithmic potential; neither of these topics can be described as "neueren Wandlungen." We then proceed to the theories of electromagnetism based on "action at a distance," and are informed at the conclusion that these developments are also not new, having been superseded by the Faraday-Maxwell theory, to which the next chapter is devoted. The author devotes a considerable amount of space to analogical representations of the electric field, but the electromagnetic theory of light is considered beyond his scope.

No doubt the author knows best what is likely to interest his hearers; it is sufficient for our purpose to note that his treatment is undeniably accurate. But it should be pointed out that the information which he assumes that his readers possess is rather heterogeneous. The training of German engineers must be very different from that of their English colleagues if they require a lengthy proof that the conservation of mechanical energy is a consequence of the Newtonian law of attraction, and yet are ready to plunge, on the next page, into a discussion of the dimensions of electrical units.

The final chapter deals with the theory of electrons; it is really a description of some of the more important properties of cathode and Becquerel rays. The mathematical aspects are hardly mentioned, so that the term "electromagnetic mass" is used without a word of explanation as to its meaning. It is to be regretted that in this part of his work, where accuracy is especially desirable in the absence of complete text-books, there are to be found many statements which require considerable revision. In fact, when we find the author stating that the diameter of an electron has been determined by the application of the kinetic theory of gases, and accounting for the ionisation of a gas by the adherence of a slow-moving electron to the neutral molecule, we begin to doubt his competency to lecture or write at all on these subjects.
N. R. C.

The Unity of Will. Studies of an Irrationalist. By George Ainslie Hight. Pp. xv + 244. (London: Chapman and Hall, Ltd., 1906.) Price 10s. 6d. net.

EVEN if the thinking of this book were of the best, it would seem a somewhat expensive morsel at half the price; and its thinking is not of the best. It professes to be an exposition of the leading doctrine of Schopenhauer, that in self-consciousness the primacy belongs to will. The author is at the same time careful to explain that he is a Vedāntist while Schopenhauer is a Buddhist, but we doubt if the ordinary man will appreciate these fine distinctions.

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We rather fear that the ordinary man will be repelled by a certain lack of unity, coherence, systematic statement, and logical proof. Thus, for example, we have a chapter full of irrelevancy on "hysteria and sophistry, the deadly evils of civilisation." Thus, too, we have a small appendix on the notion of life, which explains that everything in the world is in a certain sense alive, and seems to regard it as a valid argument that "the language of the skilled artisan is full of anthropomorphic expressions." A five-page statement of first principles at the end has certain of the merits that are so conspicuously lacking in the main body of the volume.

Diet and Dietetics. By A. Gautier. Edited and translated by Dr. A. J. Rice-Oxley. Pp. xii + 552. (London: A. Constable and Co., Ltd., 1906.) Price 18s. net.

THIS is a translation of the second edition of Prof. Gautier's book published in Paris in 1904. It contains a vast mass of useful information, and is a laudable attempt to be an exhaustive treatise on diet. It deals with the individual articles of food, animal, vegetable, and mineral; with the combinations of these that constitute dietaries; it contains (*inter alia*) discussions, lightened by homely phrases and apt illustrations, on the dietaries of different races, on vegetarianism, on the part played by food as a source of heat and energy, on the alcohol question; and finally treats of the part played by diet in the cure and alleviation of disease. Prof. Gautier's large experience would lead one to anticipate a useful book; the arrangement of subjects appears, however, to be rather confusing, and the translator, although as a rule he has done his work ably, is not always happy in rendering the original into acceptable English.

German Grammar for Science Students. By Prof. W. A. Osborne and Ethel E. Osborne. Pp. viii + 106. (London: Whittaker and Co.) Price 2s. 6d. net.

SCIENCE students who have not been taught German in schools will find this volume very useful in enabling them to read scientific papers published in that language. The essential parts of German grammar are described in sixteen lessons, and the exercises, instead of being of the "Have-you-seen-the-hat-of-my-uncle?" type, deal with scientific work and phrases—chiefly relating to chemistry—from the beginning to the end. Lists of words commonly met with in scientific German, and terms of frequent occurrence in papers on anatomical, botanical, chemical, physical, mathematical, and physiological subjects are given in an appendix. The book should be particularly valuable to private students.

LETTER TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Colour Phenomena in "*Boletus cœrulescens*."

IN reply to the query by Edgar Trevithick respecting the blue coloration in *Boletus*, Bourquelot and Bertrand (Bull. Soc. Myc., 1896, p. 18) have recently investigated the subject, and consider the action due to the presence of an oxidising ferment they have named tyrosinase. This ferment acts on certain chromogenous materials present in the fungus when exposed to the air.

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